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**Model**

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**14066**

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## **Owner/Operator Manual**

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### **FRONT END LOADER**

- Safety**
- Operation**
- Maintenance**

**For Tractors:**

**5117H**

**5118HS**

**5120H**

**13060**

**13061**

**13062**

**13063**

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# GENERAL INFORMATION

## Introduction

The purpose of this manual is to assist you in maintaining and operating your BOLENS loader. Read it carefully; it furnishes information and instructions that will help you achieve years of dependable performance. Some information may be general in nature due to unknown and varying conditions. However, through experience and these instructions, you should be able to develop operating procedures suitable to your particular situation.

"Right" and "Left" as used throughout this manual are determined by facing the direction the machine will travel when in use.

The photos, illustrations and data used in this manual are current at the time of printing, but due to possible in-line production changes, your machine may vary slightly in detail. Extra equipment that may be shown on the machine is optional at extra cost. The Manufacturer reserves the right to redesign and change the machine as may be necessary without notification.

### Important:

Illustrations used in this Manual may not show all safety equipment that is recommended to ensure safe operation of tractor/loader. Refer to Safety Section of this Manual and the Tractor Operator's Manual for information concerning safety equipment. Consult your Dealer for further information.

## Warranty Registration

The Warranty Registration form must be filled out and signed to validate your warranty. See your Dealer for Details.

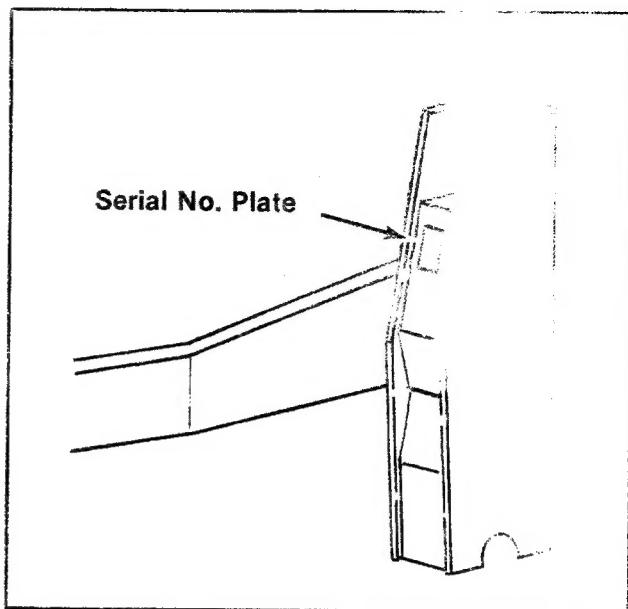


Fig. 1

## Serial Number and Location

The serial number is important information about the machine, and it may be necessary to know it before obtaining the correct replacement part. The serial number is located on the right side of loader subframe as shown. The serial number should be recorded on the Warranty Registration form. **Figure 1.**

## Replacement Parts

Genuine BOLENS replacement parts only should be used to repair this machine. BOLENS replacement parts are available from the local BOLENS dealer. To obtain prompt, efficient service, always remember to give the dealer the following information:

1. Correct part description or part number.
2. Model number of your machine.
3. Serial number of your machine.

# CHECKLISTS

## (1) Pre-Delivery Checklist

After the machine has been completely assembled and lubricated, inspect it thoroughly to be certain it is operating properly before delivering it to the customer. The following checklist is a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustment is made.

- \_\_\_\_\_ Check to make sure loader is completely assembled according to assembly instructions.
- \_\_\_\_\_ Check all bolts to make sure they are tightened to specified torque value.
- \_\_\_\_\_ Inspect and, if necessary, lubricate all lubrication points. Make sure all fittings are in place and taking grease properly.
- \_\_\_\_\_ Inspect all hydraulic hoses, lines and fittings to make sure they are installed properly and not leaking.
- \_\_\_\_\_ Make sure hydraulic hoses are properly routed and will not be damaged when the loader is raised or lowered.
- \_\_\_\_\_ Start tractor, raise and lower loader and operate bucket cylinders and make sure unit is operating properly.
- \_\_\_\_\_ Check hydraulic fluid level. Add hydraulic fluid as required. Use Type "A" Hydraulic Fluid or Equivalent.
- \_\_\_\_\_ Inflate tractor's front tires to 28 psi.

## (2) Delivery Checklist

- \_\_\_\_\_ Explain warranty, then complete warranty registration forms, listing the serial number of the loader. Dealer and customer must sign forms.
- \_\_\_\_\_ Explain importance of proper lubrication, and indicate all lubrication points on the loader.

# CHECKLISTS

## Delivery Checklist Cont'd.

- \_\_\_\_\_ Advise customer of safety hazards involved when operating the tractor and loader. Refer to "Safety Precautions" section of manual.
- \_\_\_\_\_ Advise customer of the importance of adding proper rear wheel weights Kit No. 30902 to rear wheels of tractor to compensate for additional weight being added to front end when loader is installed. Kit No. 30902 provides only the minimum rear wheel weight requirements.
- \_\_\_\_\_ Explain proper operation of the loader and its controls to the customer.
- \_\_\_\_\_ Give Operator's Manual to the customer and ask him to familiarize himself with all sections.
- \_\_\_\_\_ Explain to the customer that when the tractor and loader combination is transported on public roads and highways at night or during the day, accessory lights, warning devices or a Slow Moving Vehicle emblem should be used to properly warn operators of other vehicles. Check with local law enforcement officials for specific regulations.

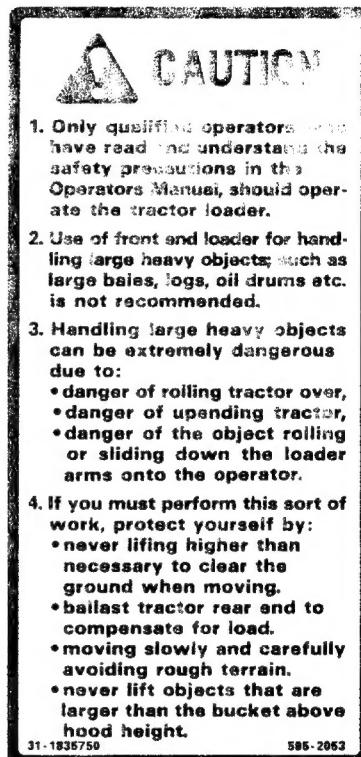
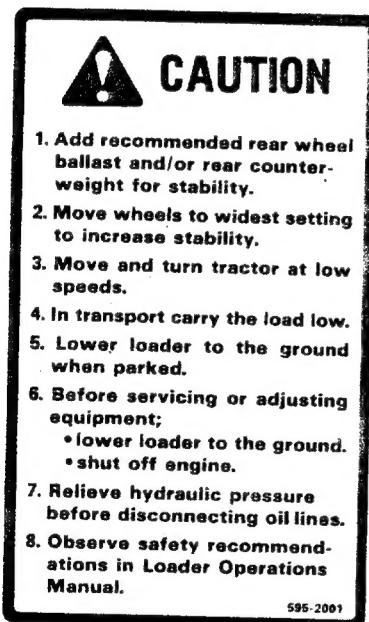
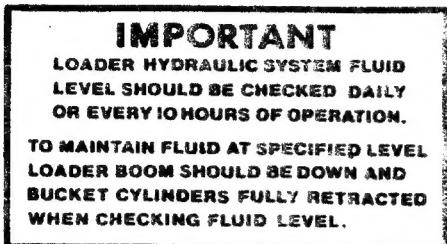
## (3) Beginning Each Season Checklist

- \_\_\_\_\_ Check all hydraulic hoses, lines and fittings to be sure they are tight and not leaking. Replace any worn or damaged parts.
- \_\_\_\_\_ Check hydraulic fluid level and add as required. Use Type "A" Hydraulic Fluid or Equivalent.
- \_\_\_\_\_ Operate loader by raising and lowering lift arms and extending and retracting bucket cylinders. Check all hydraulic cylinders for leakage around seals. Repair as required.
- \_\_\_\_\_ Review "Safety Precautions" Section of manual.
- \_\_\_\_\_ Make sure loader has been completely lubricated per "Lubrication" section prior to beginning operation.
- \_\_\_\_\_ Check all bolts on loader mounting frame to be sure they are properly tightened to specified torque value.
- \_\_\_\_\_ Check for any special attachment which will help you do a better job.

# SAFETY

## Product Graphics

Read all Safety decals on machine, as shown below.



### PRODUCT GRAPHICS

Keep safety product graphics (decals) clean. Replace any safety product graphics that are damaged, destroyed, missing, painted over or can no longer be read. Replacement safety product graphics are available through your dealer.

# SAFETY

## Product Graphics

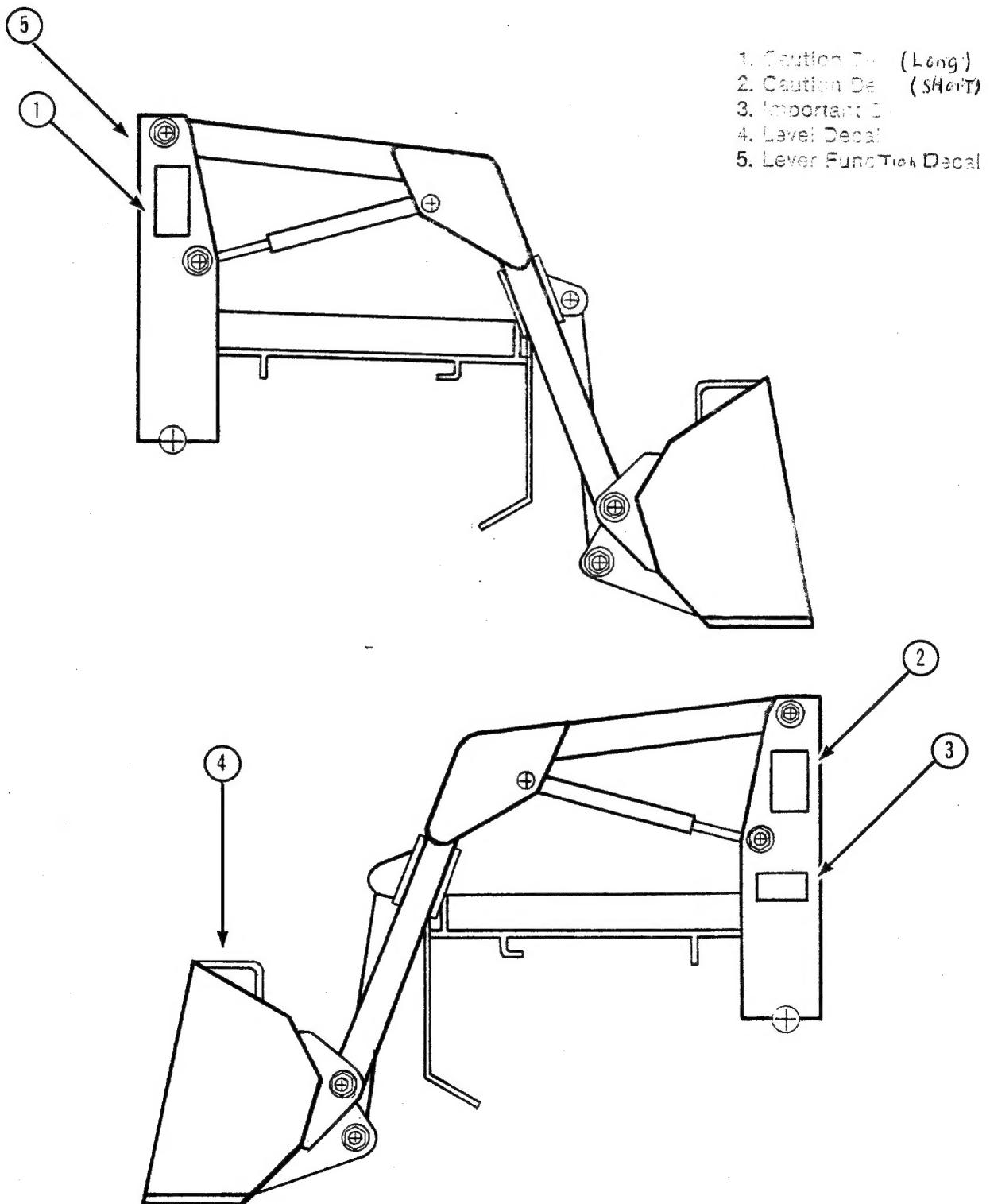


Fig. 2

# **SAFETY**

## **Safety Precautions**

**WATCH OUT! . . .**



. . . for this symbol throughout this book. It will direct your attention to information that involves your safety!

**For your own protection and for the protection of others near the machine, study the following list of safety precautions. Fulfill your responsibility of informing anyone else operating the machine of these precautions.**

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### **Improper use of a loader can cause serious injury or death**

Learn and practice safe use of controls before operating. It is your responsibility to understand and follow manufacturer's instructions on machine operation and service, and to observe pertinent laws and regulations. It is also your responsibility to be certain that anyone, other than yourself operating the loader, is aware of safe operating practices and potential hazards.

Clear the area of other persons.

Operate the loader from the tractor seat only.

Prohibit others, especially children, from climbing or riding on machine or being too close while machine is operating.

Do not stand, walk or work under a raised loader or attachment unless it is securely blocked in position. Accidental movement of control lever or leak in hydraulic system could cause loader to drop, resulting in severe injury.

Do not lift or carry personnel on a loader or attachment; a slip or fall could cause bodily injury.

Load on raised bucket or fork can roll back onto operator area, causing serious injury or death.

When loading material from a large pile, remove the top level first to prevent material from falling, causing death, personal injury, or damage to equipment.

Remove Mid Mount Mower (if equipped) during loader operation.

# SAFETY

## Safety Precautions

Do not carry round bales on loader unless loader is equipped with a restraining device to prevent bale from rolling down loader frame, resulting in severe injury or death to the operator.

Always use adequate lights or safety warnings when transporting machine on public roads and after dark. Be certain SMV emblem is visible. Check with your local law enforcement agencies for specific requirements.

Avoid loose fill, rocks and holes; they can be dangerous for loader operation or movement.

Be careful when working on inclines.

Allow for the loader length when making turns.

Before disconnecting hydraulic lines, relieve all hydraulic pressure. Escaping hydraulic oil under pressure can have sufficient force to penetrate the skin, causing serious personal injury.

If injured by escaping fluid, obtain medical treatment immediately.

Do not operate the loader if the fittings are leaking or if the hoses are damaged. A sudden line burst would cause the loader to drop suddenly, causing injury to personnel or damage to the tractor or loader.

A loader bucket or attachment should be transported in a low position at slow ground speeds, especially if the ground is irregular. Make turns slowly and use the tractor brakes cautiously. A full bucket in the raised position alters the center of gravity location of the machine and increases the possibility of mishaps.

Lower all components before leaving the machine. All attachments should be in closed position and Bucket resting on Ground. Elevated components can fall and cause serious injury.

Never work beneath a raised loader unless it is securely blocked with a safety bar. A suitable safety bar can be fabricated following dimensions in the illustration below.

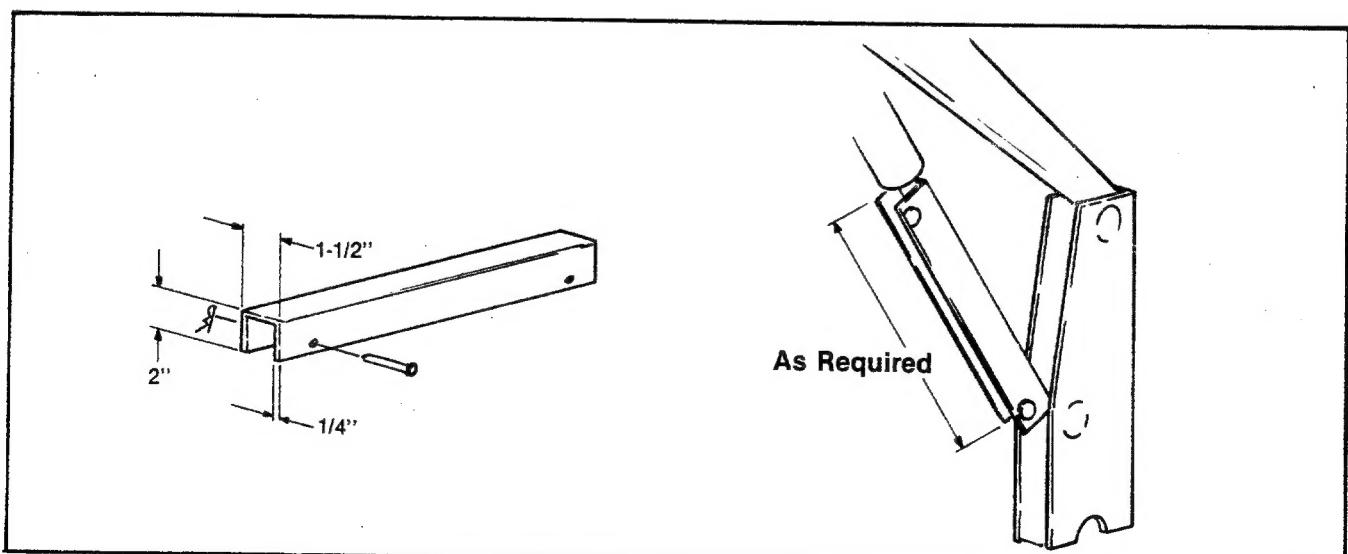
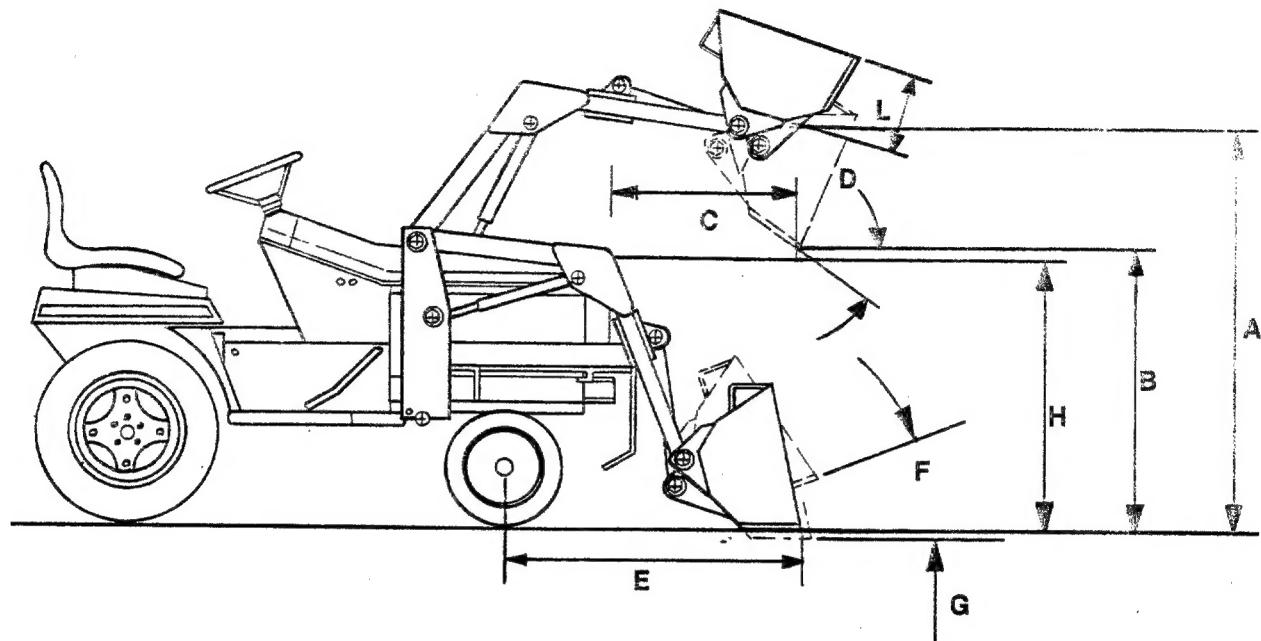


Fig. 3

# LOADER SPECIFICATIONS

Specifications shown are based on ASAE Standards. Specifications may vary with tractor model, front axle configurations, tire size options and type of Attachment.



Front Tires.....	16-6.50 (4 ply) 28 psi
Rear Tires.....	23-10.50 12 psi
A Maximum Lift Height.....	63.5"
B Clearance with Bucket Dumped.....	49.0"
C Reach at Maximum Height.....	15.5"
D Maximum Dump Angle.....	37 °
E Reach with Attachment on Ground.....	40.75"
F Attachment Rollback Angle.....	17°
G Digging Depth Below Grade.....	2.0"
H Overall Height in Carry Position.....	42.75"
L Length of Attachment.....	15.0" (Nom.)
Lift Capacity to Full Height.....	350 lbs.
Breakaway Capacity.....	700 lbs.
Bucket Cylinders.....	2.0" x 8.5"
Lift Cylinders.....	1.5" x 11.5"
Relief Valve Pressure Setting.....	1400 psi
Material Bucket.....	40"

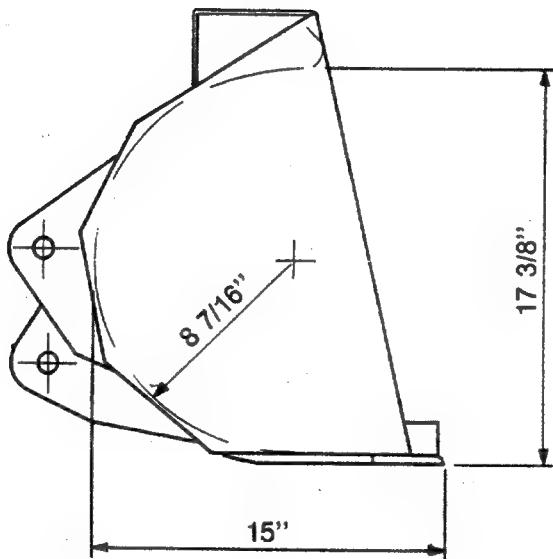
## CYCLE TIMES

	Idle	1/2 Throttle	Full Throttle
Lift Boom	7.6 sec.	2.9 sec.	2.4 sec.
Lower Boom	4.1	2.2	2.1
Dump Bucket	3.4	1.4	1.3
Retract Bucket	5.1	2.0	1.7

# LOADER SPECIFICATIONS

## Material Bucket Capacities

Bucket Width	Struck Capacity			Rated (Heaped) Capacity		
	Cu Yd.	Cu. Ft.	Cu. Meters	Cu. Yd.	Cu. Ft.	Cu. Meters
40"	.16	4.2	.12	.19	5.0	.14



# LUBRICATION AND MAINTENANCE

Do not perform any Service/Maintenance Operations with loader raised off ground. For additional access to tractor components remove loader.

## Important:

Lower the loader to the ground and relieve pressure in loader hydraulic lines prior to performing any service/maintenance operations on the tractor or loader.

**WARNING!** Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious injury. Before disconnecting lines, be sure to relieve all pressure. Before applying pressure to the system, be sure all connections are tight and that lines, pipes and hoses are not damaged. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood rather than your hands to search for suspected leaks.

See a Doctor at once if injured by escaping fluid. Serious infection or reaction can develop if correct medical treatment is not administered immediately.

**CAUTION.** Do not operate the loader if the fittings are leaking or if the hoses are damaged. A sudden line burst could cause the Boom Assembly to drop suddenly, causing damage to the tractor or loader or injury to personnel.

**CAUTION.** Operate the loader from the tractor seat only.

**CAUTION.** Do not stand or walk under a raised attachment. Accidental movement of control lever or leak in hydraulic system could cause Boom Assembly to drop, causing severe injury.

Refer to "Lubrication and Maintenance Ch." for quick reference to Maintenance Operations. Figure 4.

Check hydraulic system fluid level. Lower loader to ground and retract bucket fully. Remove Overflow plug located on inside face of RH Loader upright/Reservoir. Fill reservoir to Overflow. Use Type "A" hydraulic fluid or equivalent.

## Note:

When checking Hydraulic System Oil Level, the Loader should be on the ground and bucket fully retracted. (All Cylinders in Retracted position.)

Drain and replace Hydraulic fluid and Filter every 300 hrs./annually. Use Hydraulic Fluid Reservoir Return port to Drain Reservoir.

Service interval should be shortened if loader is operated in adverse conditions.

Use Type "A" Hydraulic Fluid or Equivalent.

Grease all loader pivot points daily (10 hours). Refer to Tractor Operators Manual for lubricant recommendations.

Inspect hydraulic hoses, connections, control valve and cylinders for evidence of leakage.

Tractor Tire inflation should be checked at recommended intervals to ensure tire inflation is to specifications.

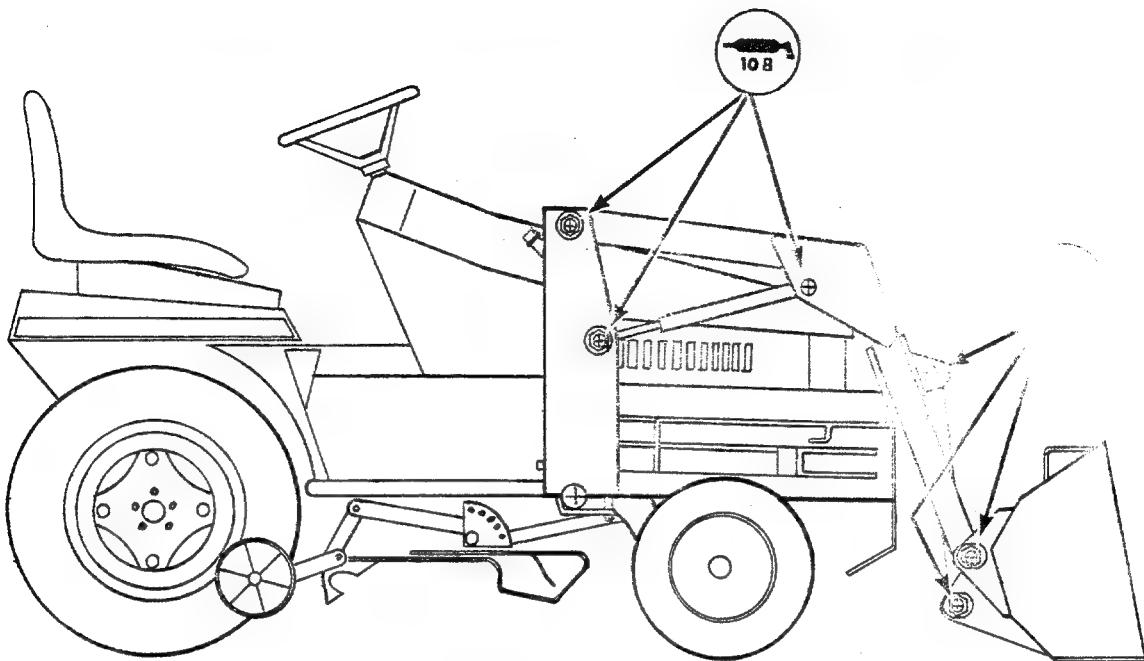
Front - 28 psi  
Rear - 12 psi

Unequal rear tire inflation can result in bucket not being level to the ground.

Front tires should be maintained at maximum recommended inflation to maintain normal tire profile with added weight of loader/material.

**CAUTION.** The tractor/loader should only be operated with all safety equipment properly installed.

# LUBRICATION AND MAINTENANCE



Lubricate with pressure gun using grease as recommended in Tractor Operators Manual.

ITEM	SERVICE	SERVICE INTERVAL
Hydraulic System Oil Level	Check	Daily/10 Hours
Hydraulic System Oil/Filter	Replace	Annually
Tire Inflation	Check	Weekly/50 Hours
Loader Pivot Points	Lubricate	Daily/10 Hours
Loader Hydraulic Lines Hoses, Connections	Check for Leaks/Wear	Daily/10 Hours
Lift and Bucket Cylinder Rod Packings	Check for Seepage	Daily/10 Hours
Pivot Pin Clips	Check Replace if Missing	Daily/10 Hours
Subframe Hinge Clamping Bolts	Check Re-torque if necessary	Weekly/50 Hours
Loader Mount Hardware	Check Visually Re-torque	Weekly/50 Hours Every 200 Hours

Fig. 4

# TRACTOR PRESENTATION

## Approved Tractors

### IMPORTANT!

To prevent structural damage, all Tractors must be equipped with Heavy Duty Front Axle. Order Front Axle Kit 51911 for all Tractors below Serial Numbers listed.

5117H-0300101

5120H-0300101

5118HS-0200101

## Tractor Tires

### IMPORTANT!

Tractor must be equipped with 4-ply tires contained in Loader package. Inflate tires to 28 psi.

Front tires should be maintained at correct inflation to maintain normal tire profile with added weight of loader and material.

Rear tires must be maintained at equal pressure within the recommended tire inflation range. Unequal rear tire inflation can prevent loader attachment from contacting the ground across its full width.

## Rear Counterweight

 CAUTION! Add recommended rear wheel ballast for increased stability.

The use of adequate counterweight to counterbalance for maximum loader capacity is required for safe loader operation.

Weight added to rear of the tractor provides better traction and easier, more efficient loader operation.

Additional counterweight requirements will vary with loader attachments and equipment applications.

Additional weight should be added by installation of Rear Wheel Weights. Kit 3092 provides minimum weight requirements.

## Front Counterweight

Use of Front Counterweight is not recommended when tractor is being used in a loader application.

Front Counterweight adds unnecessary front axle load in loader applications.



CAUTION! Certain applications may not permit safe use of loader at loader rating or may require more careful restricted operation at the rated load.

# OPERATION

## Precautionary Notes

Do not lower the edge of an attachment too low for loading. Keep the bottom of the attachment level with the ground when loading.

**Important:**

Do not use an attachment for pushing down material with the cylinders partially extended. Damage to the cylinders may result.

**Important:**

Make sure that bucket is contacting the stops before leveling or scraping with it.

**Important:**

Operation with front tractor wheels off the ground is not recommended.

Position vehicles to be loaded as near the pile as possible and in such a direction as to minimize the amount of tractor turning required to dump.

Do not lower the loader with the tractor engine shut off.

Keep the unit clean and perform regular service. Observe safety pointers whenever cleaning, servicing, or lubricating.

We urge you to follow this advice:

1. Read and understand this manual as well as the tractor Operator's Manual.
2. Remember and observe the Safety Precautions (particularly the "Don'ts") brought to your attention in this manual, the tractor manual and on the machinery itself.
3. Use good common sense in the everyday operation of this unit. Safety recommendations can never be all-inclusive and you are responsible for watching out for and avoiding unsafe conditions.
4. Never exceed the limits of a piece of machinery. If its ability to do a job or to do so safely is in question — Don't Try It.
5. Don't hurry the learning process or take the unit for granted. Ease into it and become familiar with your new loader and tractor.



**CAUTION.** When lowering a heavy load, ease it downward slowly. Never drop loaded attachment and "catch" hydraulically stopping a load after it has gained downward momentum places undue strain on the unit and may cause unnecessary damage to the loader or tractor or even worse, personal injury.



**CAUTION.** Before disconnecting hydraulic lines, relieve all hydraulic pressure. Escaping hydraulic oil under pressure can have sufficient force to penetrate the skin causing serious personal injury. If injured by escaping hydraulic oil, consult a physician immediately.



**CAUTION.** Do not operate the loader if the fittings are leaking or if the hoses are damaged. A sudden line burst would cause the Boom Assembly to drop suddenly, causing damage to the tractor or loader or injury to personnel.

**BEFORE OPERATING, LUBRICATE ALL MOVING PARTS**

## Cold Weather Operation

To assure smooth operation in cold weather, allow tractor to warm up. SLOWLY cycle the loader and attachment several times to warm the fluid in the hydraulic system. The loader may operate erratically until the hydraulic fluid has warmed to operating temperatures.

# OPERATION

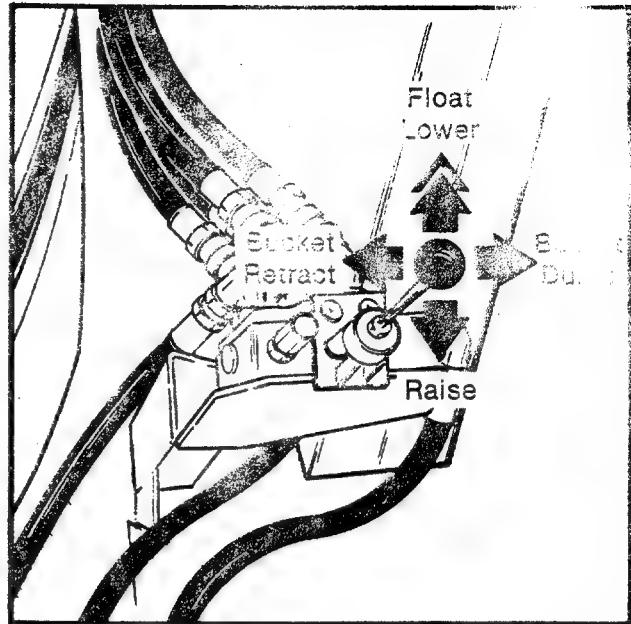
## Loader Hydraulic Controls

Loader Hydraulics are activated by Engaging Tractor front P.T.O. The P.T.O. switch is located on the RH side of the Instrument Panel.

The loader Hydraulic Valve Features Single Lever Control. Refer to figure 5 for reference to Loader Control Functions.

The Loader Hydraulic Valve Lift Cylinder circuit incorporates a "Float" position which allows the loader bucket to follow ground contours. The "Float" position is engaged by shifting the control lever forward into "Detent". The Loader Hydraulic Valve will remain in "Detent" until the operator pulls the control lever out of the "Detent" position.

Refer to "Scraping" operation for recommended use of "Float" position.



Single Lever Control

Fig. 5

# OPERATION

## Loading

Drive straight into pile with the bucket cutting edge level with the ground. In order to prevent possibility of damaging tractor or loader –

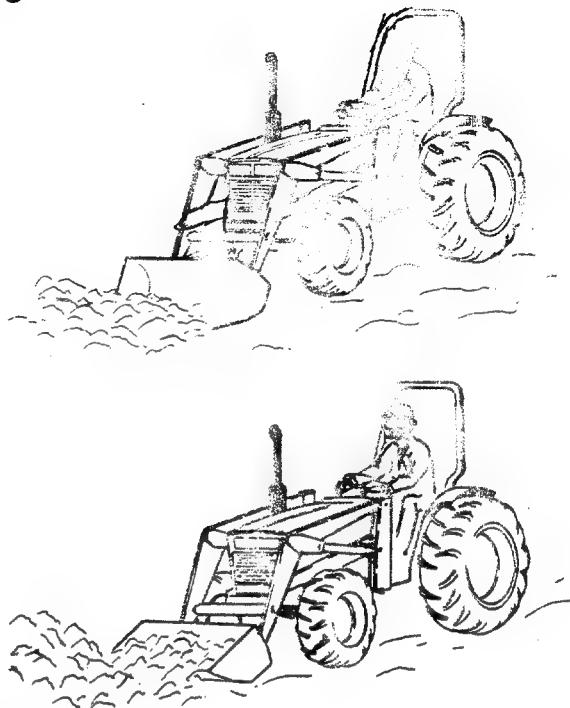
**Do not ram into pile at high speed.**

**Do not attempt to turn tractor while loading.**

As the bucket begins to fill with material, gradually roll the bucket back and raise the loader to increase "Fill" capacity. This procedure also results in the material being removed in layers from the top for maximum loading efficiency.

When the bucket is full, raise loader so that the bucket is clear of material and slowly back out of pile.

For maximum loading efficiency, minimize angle of turn and distance between the Loading and Unloading points.



## Transporting Material

Transporting material to "Unloading Point" with Loader Bucket as low as possible to prevent spillage and maintain maximum Tractor/Loader stability.

**Important:**

During transport the loader should not be in a position that will impair operator's vision.

Observe the following safety messages.



**⚠ WARNING.** A loaded bucket should be transported in a low position at slow ground speeds, especially if the ground is irregular. Make turns slowly and use the tractor brakes cautiously. A full bucket in the raised position alters the center of gravity location of the unit and increases the possibility of mishaps.

**⚠ WARNING!** Do not lift or carry personnel on a loader or attachment; a slip or fall could cause bodily injury.

# OPERATION

## Unloading

As the tractor approaches the "Unloading Point", raise the loader to the height required for clearance to "Dump" bucket.

Drive slowly to position bucket above "Unloading Point", stop tractor and dump bucket.

**Note:**

Do not raise loader higher than required for "Dumping" clearance.

As "Dumping" clearance height increases, the bucket position must be adjusted to maintain a level bucket to prevent excessive spillage of material from bucket.



**DANGER.** Load on raised bucket can roll back onto operator area causing severe injury or death. Load must be kept level.



**DANGER.** Avoid any overhead wires or obstacles when loader is raised, to avoid damage or possible death by electrocution.



## - Scraping



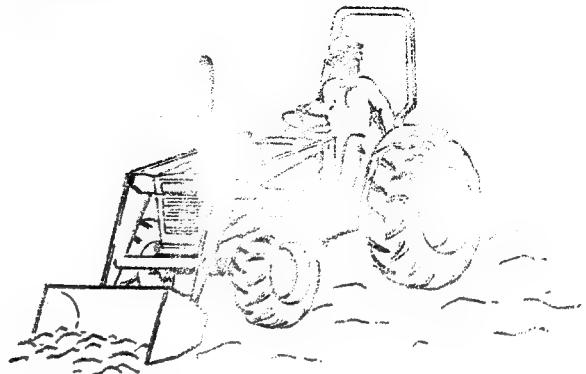
When scraping, the "Float" position should be utilized to maintain the bucket firmly on the ground and at the same time allow the bucket to follow ground contours.

The bucket should be positioned level to the ground during "Scraping" operations.

# OPERATION

## Backfilling/Backgrading

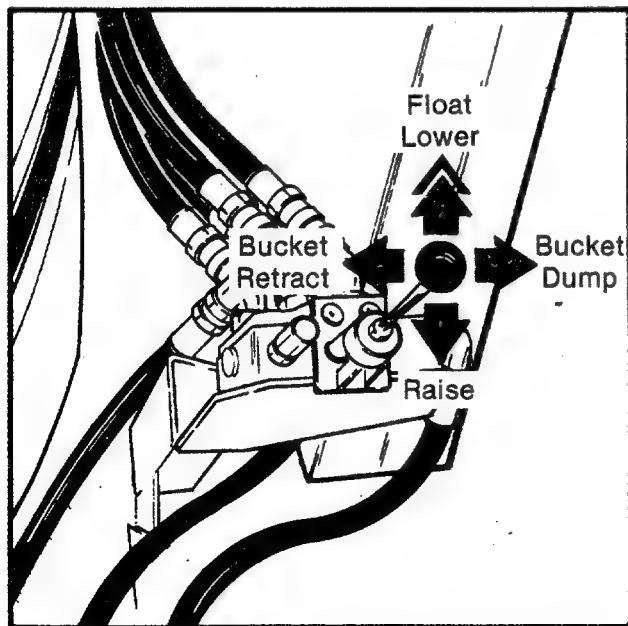
When "Backfilling" or "Backgrading", position the bucket so it is level on the ground. Do not dump material from bucket following each pass as additional weight of material in bucket will assist in "Backgrading" and increases loader efficiency during "Backfilling".



## Controlled Rate of Loader Function

By "Feathering" the Control Lever, reduced operational speeds can be controlled. This action controls the position of the Valve Spool in the Valve Body and regulates flow of oil to/from cylinders.

It is important to utilize this operational practice when lowering Loader Boom when the Bucket is loaded with material.



Single Lever Control

# **LOADER REMOVAL AND INSTALLATION**

## **REMOVAL OF LOADER**

Select a level place to remove loader.

Lower Loader and position Bucket flat on ground.

Shut Tractor off and engage parking brake.

Shift Loader Hydraulic Valve into all modes to completely relieve hydraulic pressure in Loader Hydraulic System.

Remove Hinge Assemblies.

Start Tractor and adjust Engine Speed to idle.

**CAUTION!** During Loader removal, Loader Pressure and Return Hoses must be clear to extend forward with Loader. Ensure Hydraulic Hoses are kept in a position to prevent them from interfering with adjacent Tractor/Mower components.

Slowly extend Lift Cylinders to raise Subframe out of Rear Mount.

Slowly back Tractor out of Loader. Extend Lift Cylinders as necessary to clear front tires.

**Note:** Loader may need to be lifted off ground approximately 2" to allow tractor to clear.

When Front Mount contacts Parking Stop, extend Lift Cylinders until Loader Subframe/Pump Guard rests firmly on ground.

Shut Tractor off and engage Parking Brake.

Remove Hydraulic Pump retaining hardware and disengage from Tractor Front PTO.

Position Hydraulic Pump on Loader for storage.

## **INSTALLATION**

Advance Tractor into Loader until front Mount contacts Subframe Arms.

Shut Tractor off and engage parking brake.

Engage Hydraulic Pump to Tractor Front PTO.

Start Tractor and adjust Engine Speed to idle.

Retract Lift Cylinders and advance Tractor slowly.

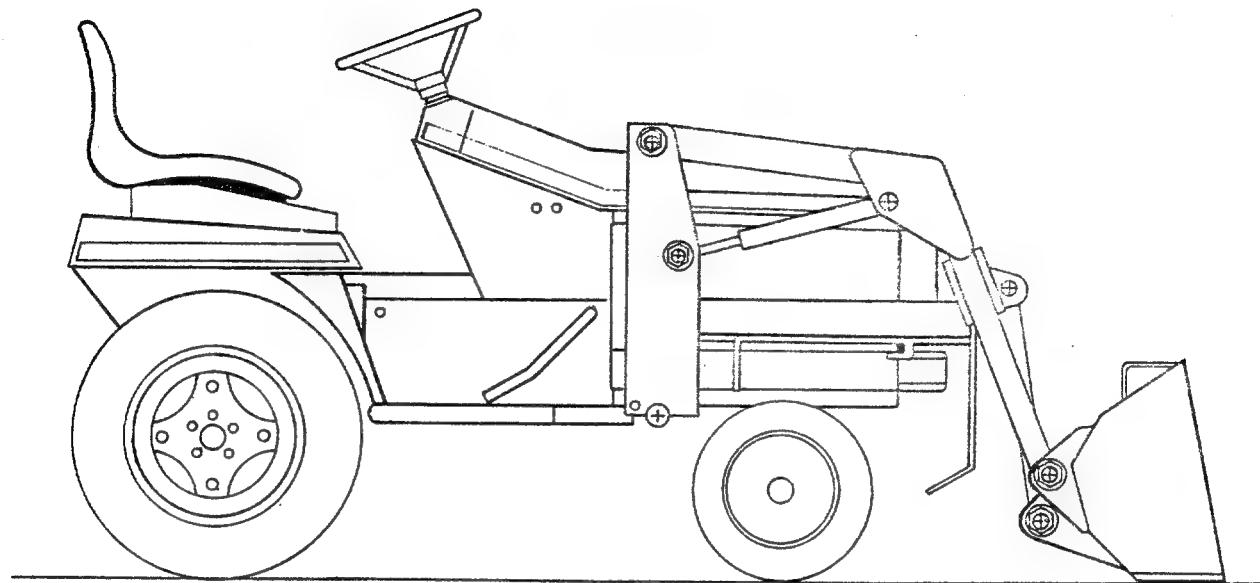
When Front Mount is secure in Retaining Hooks, retract Lift Cylinders to place Loader Subframe in Rear Mounts.

Shut Tractor off and engage parking brake.

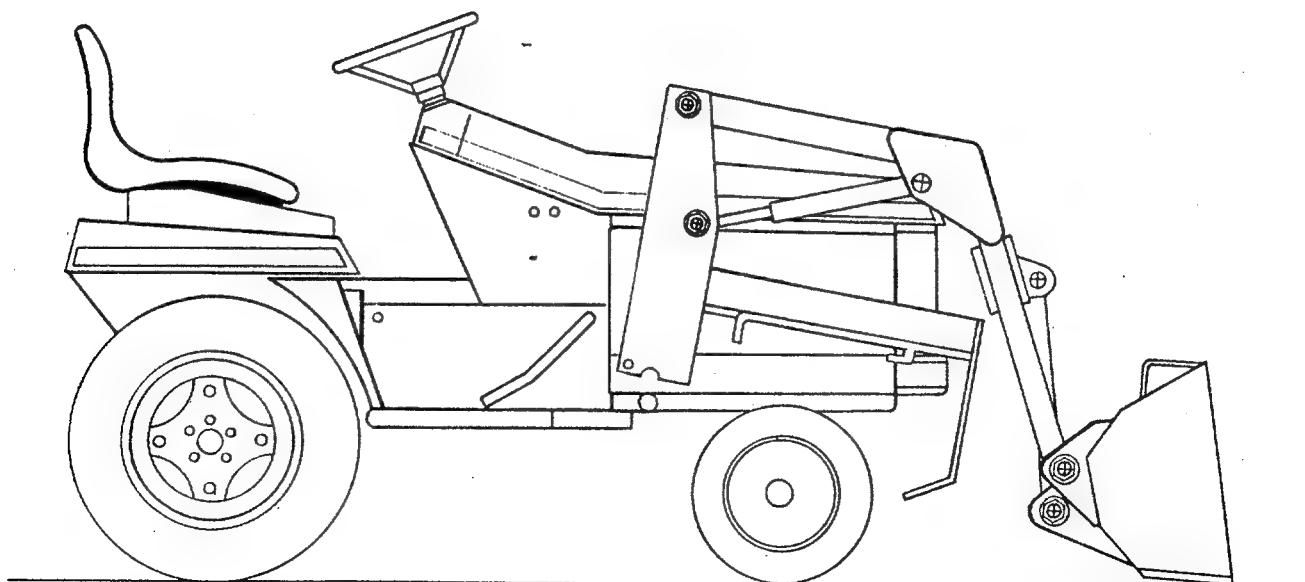
Shift Loader Hydraulic Valve into all modes to completely relieve hydraulic pressure in Loader Hydraulic System.

Install Hinge Assemblies on Loader Subframe.

## **LADDER REMOVAL AND INSTALLATION**



**Fig. 7**



**Fig. 8**

## LOADER REMOVAL AND INSTALLATION

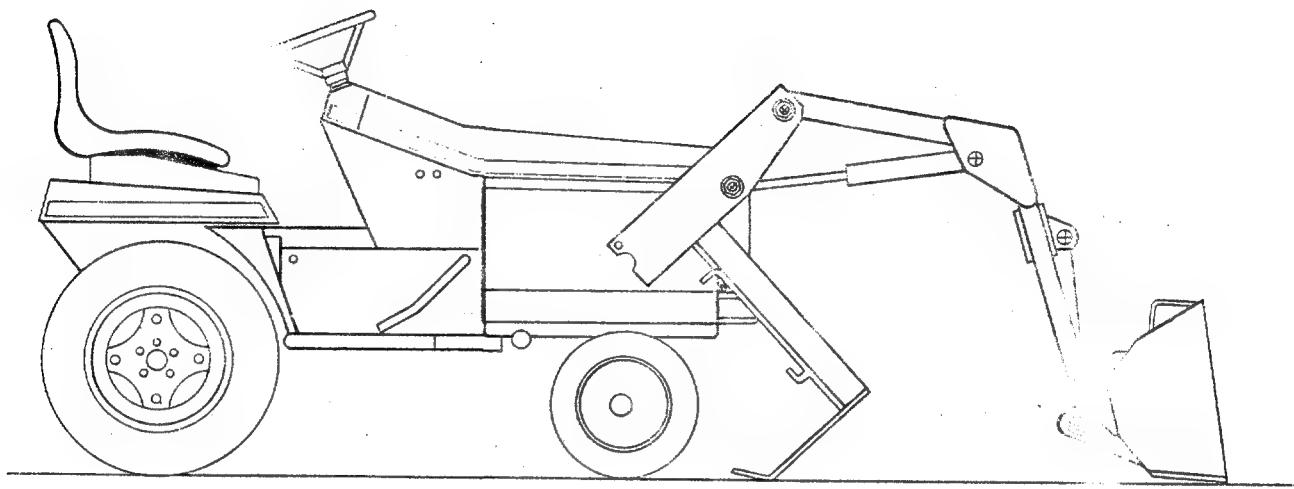


Fig. 9

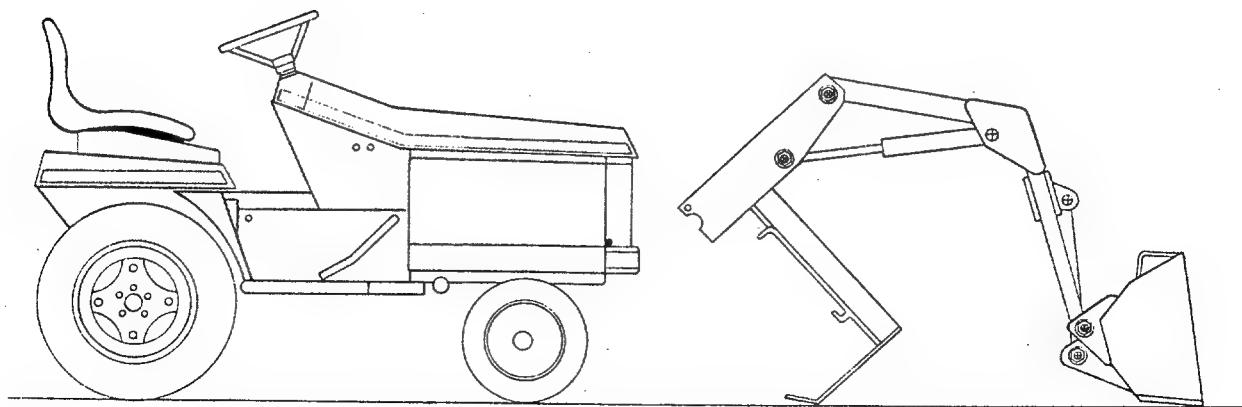


Fig. 10

# STORAGE

## End of Season

1. If loader is to be dismounted from the tractor during storage, make sure parking area is on hard, level ground. Cap all hydraulic hoses to prevent contamination.
2. Store loader in a dry, sheltered area, if possible.
3. Thoroughly clean the loader of all accumulated dirt and grease.
4. Completely lubricate the loader as specified in "Lubrication" section of manual.
5. Using an oil soaked cloth, lubricate all hydraulic cylinder rods to protect them from rust and corrosion.
6. Repaint any areas where paint is worn or damaged.
7. Wear areas on buckets or other attachments should be coated with grease to prevent rust or corrosion.
8. Replace any Safety or Warning decals that are not readable due to wear or damage.
9. Replace any damaged or worn parts.

**⚠ WARNING! Do not allow children to play on or around the tractor or loader.**

## Beginning of Season

1. Thoroughly clean the loader of all accumulated dirt and grease.
2. If removed from tractor for storage, remount loader per procedure in this manual.
3. Completely lubricate the loader as specified in "Lubrication" section of manual. Make sure the fittings are taking grease properly.
4. Clean with solvent any exposed surfaces which had been coated with grease. Wipe dry with a clean cloth, then lubricate with an oil-soaked cloth.
5. Tighten any bolts that have loosened and make sure all pins and retainers are in place.
6. Start tractor and operate loader to make sure it is operating properly and all the hoses are properly connected.
7. Check hydraulic fluid level and fill as required.
8. Make sure hydraulic hoses, lines and fittings are in good shape and not leaking. Replace or repair as required.
9. Review Safety Precautions and Operation sections of manual.

# SERVICE

## Hydraulic Cylinder Service

### General

Cylinder ports should be capped at all times when hydraulic hoses are disconnected to prevent contamination.

### Cylinder Disassembly

Refer to illustration for component identification.

Drain all oil from cylinder and retract rod fully.

Secure Cylinder Assembly in a bench vise by the cylinder body and eye.

Remove Gland Assembly as follows:

Rotate Gland until end of Retaining Wire is visible in "cutout" section of Cylinder Body.

Pry Retaining Wire up and rotate Gland in reverse direction and continue rotating to feed Retaining Wire out of Cylinder Body.

Pull Cylinder Rod Assembly out of Cylinder Body. (Gland will come out of Cylinder Body along with Cylinder Rod Assembly).

Secure the Cylinder Rod Assembly in a bench vise by the end eye of the rod. **Do not clamp on the chromed finish section of the rod.**

Remove Piston Assembly locknut and pull Piston Assembly from rod.

### Inspection

Clean all parts thoroughly.

Inspect Cylinder Body for evidence of scoring and pitting. Replace Cylinder Body if excessive pitting/scoring is evident.

Inspect Cylinder Rod for evidence of plating or plating deterioration through the section of the rod that contacts the Rod Seal.

Inspect Cylinder Rod and Body End Eyes for evidence of excessive wear.

Inspect Cylinder Gland and piston. Replace any components that exhibit excessive wear or damage.

It is recommended that all Cylinder Seals be replaced during Cylinder Assembly.

### Cylinder Assembly

Clean and dry all Cylinder components thoroughly.

Install seals on Piston and Gland.

Place Gland Assembly on Cylinder Rod.

#### Note:

Refer to illustration for reference to component orientation and sequence.

Assemble Piston Assembly on Cylinder Rod referring to illustration for reference to component orientation and sequence.

Install locknut and torque to 75 ft./lbs.

# SERVICE

In hydraulic oil and  
bed in a bench vise,  
ed Assembly in  
e taken to ensure  
uring installation.

with clean hydraulic  
ider Body to align re-  
"cutout" section in

Rotate Gland so  
groove is aligned  
located in retaining wire  
the Cylinder Body cutout.  
Install "hook" end of retaining wire in hole and  
rotate Gland clockwise until retaining wire is pulled into place in  
Gland/Cylinder Body grooves.

## Important:

Rotate Gland to a final position that causes the ends of the retaining wire approximately one half turn beyond the "cutout" section of the Cylinder Body.

## Note:

Install dust plugs in Cylinder ports.

## Hydraulic Cylinder Assembly

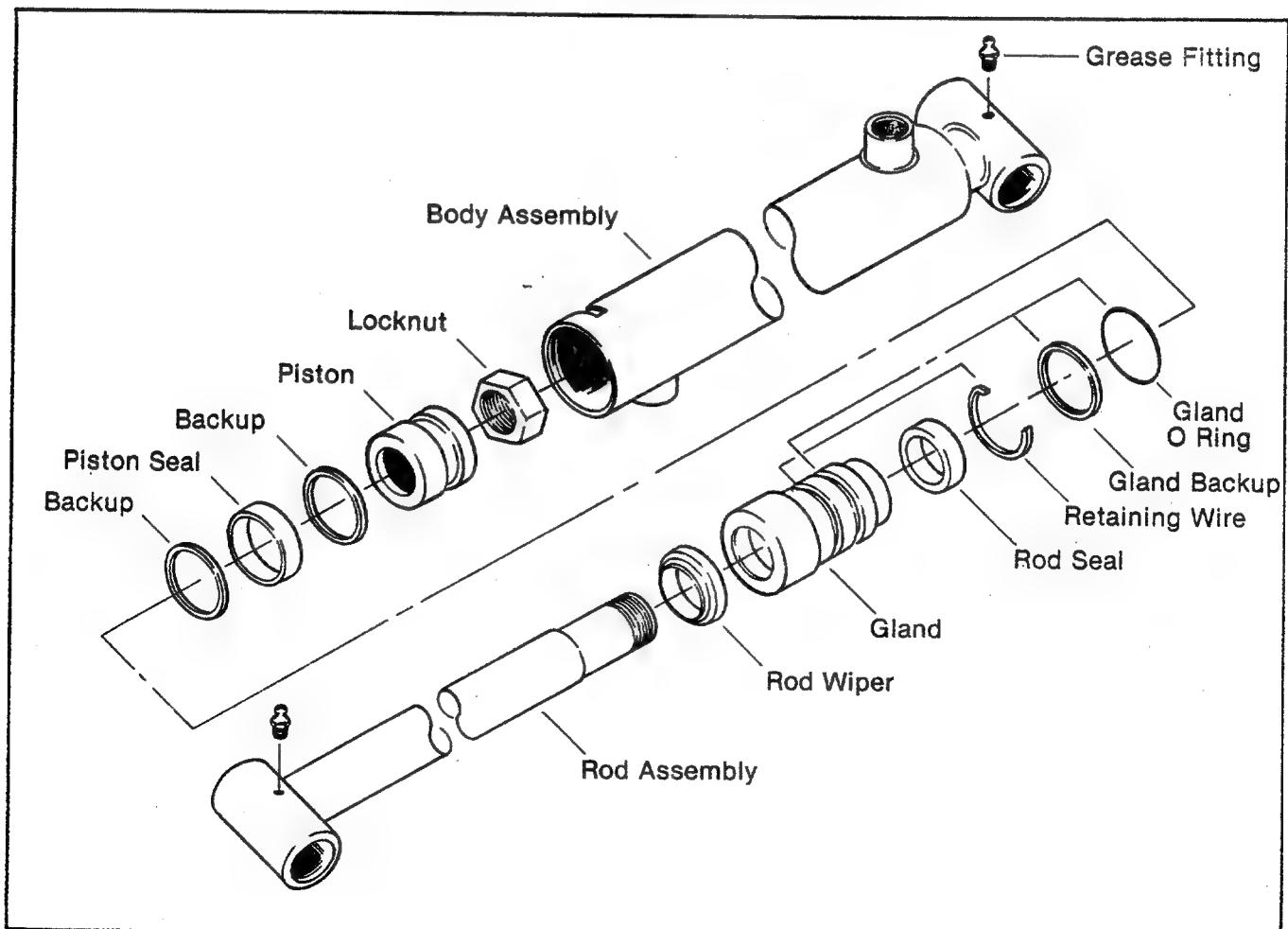


Fig. 11

# SERVICE

## Hydraulic Cylinder Leakage Test

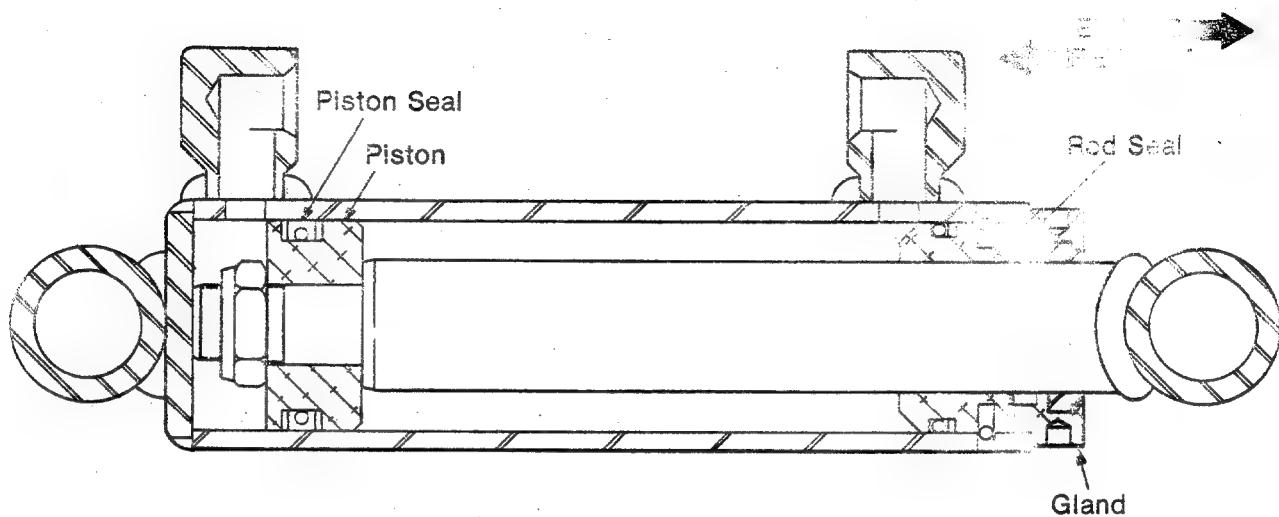


Fig. 12

### General



**CAUTION!**

**Safety glasses should be worn when performing Cylinder Leakage Tests.**

When performing Cylinder Leakage Tests the tractor engine should be operating at mid R.P.M. to ensure the hydraulic system reaches the Relief Valve Setting.

During tests, the System Relief Valve governing maximum pressure to the Loader Cylinders will be "Open", (system is at Relief Valve Setting).

**Note:**

Do not maintain Hydraulic System at Relief Valve Setting pressure for more than 20 second intervals to prevent overheating hydraulic system.

The Test Procedures outlined enable the cylinders to be checked for Rod Seal Leakage (External Leakage) and Piston Seal Leakage in both directions (Internal Leakage).

### Test Procedure

Lower Loader to the ground, shut tractor off and disconnect cylinders as follows:

**Lift Cylinder Test** - disconnect from Subframe (Rod End).

**Bucket Cylinder Test** - disconnect from Bucket (Rod End).

Support the Cylinders to prevent excessive strain on hydraulic hoses in a position that will allow the Cylinders to be completely "Extended".

# SERVICE

## Hydraulic Cylinder Leakage Test

### Rod Seal Leakage Test

Start tractor and "Retract" Cylinders completely.

Continue to hold Control Valve Lever in position to "Retract Cylinders" and check for evidence of oil leakage past the Rod Seal (External Leakage).

**Note:**

On cylinders that have been in service, Rod Seal leakage is usually indicated by accumulation of dirt/oil at rod end of Cylinder Body.

If leakage is evident, the cylinder(s) should be removed and disassembled for inspection and repair.

**Note:**

Inspect Cylinder Rod for pitting, deterioration or damage to the chrome finish. Any excessive damage to the chrome finish reduces the ability of the Rod Seal to seal properly.

If Rod Seal tests are satisfactory proceed to Piston Seal Assembly Leakage Test.

### Piston Seal Leakage Test

With cylinders in the fully "Retracted" position and tractor shut off, disconnect the hydraulic lines from the base end of cylinders. Route a hydraulic hose from the cylinder base to a container (to catch oil during leakage test).

Start tractor and place Loader Control Valve Lever in the position to "Retract" Cylinders and "Hold".

Check for oil leakage from base end port of cylinders.

A constant dripping or very slight flow of oil is normal. If a steady flow of oil is evident excessive wear or damage of the Piston Seal is indicated and the cylinder(s) should be removed and disassembled for inspection and repair.

If Piston Seal Leakage Test in "Retract" position indicates Piston Seal is satisfactory, reinstall hydraulic hoses and fully extend cylinders to perform test in "Extend" position.

With cylinders in the fully "Extended" position and tractor shut off disconnect the hydraulic lines from the rod end of cylinders. Route a hydraulic hose from the cylinder rod end ports to a container (to catch oil during leakage test).

Start tractor and place Loader Control Valve Lever in the position to "Extend" Cylinders and "Hold".

Check for oil leakage from rod end port of cylinders.

A constant dripping or very slight flow of oil is normal. If a steady flow of oil is evident excessive wear or damage of the Piston Seal is indicated and the cylinder(s) should be removed and disassembled for inspection and repair.

# SERVICE

## Control Valve

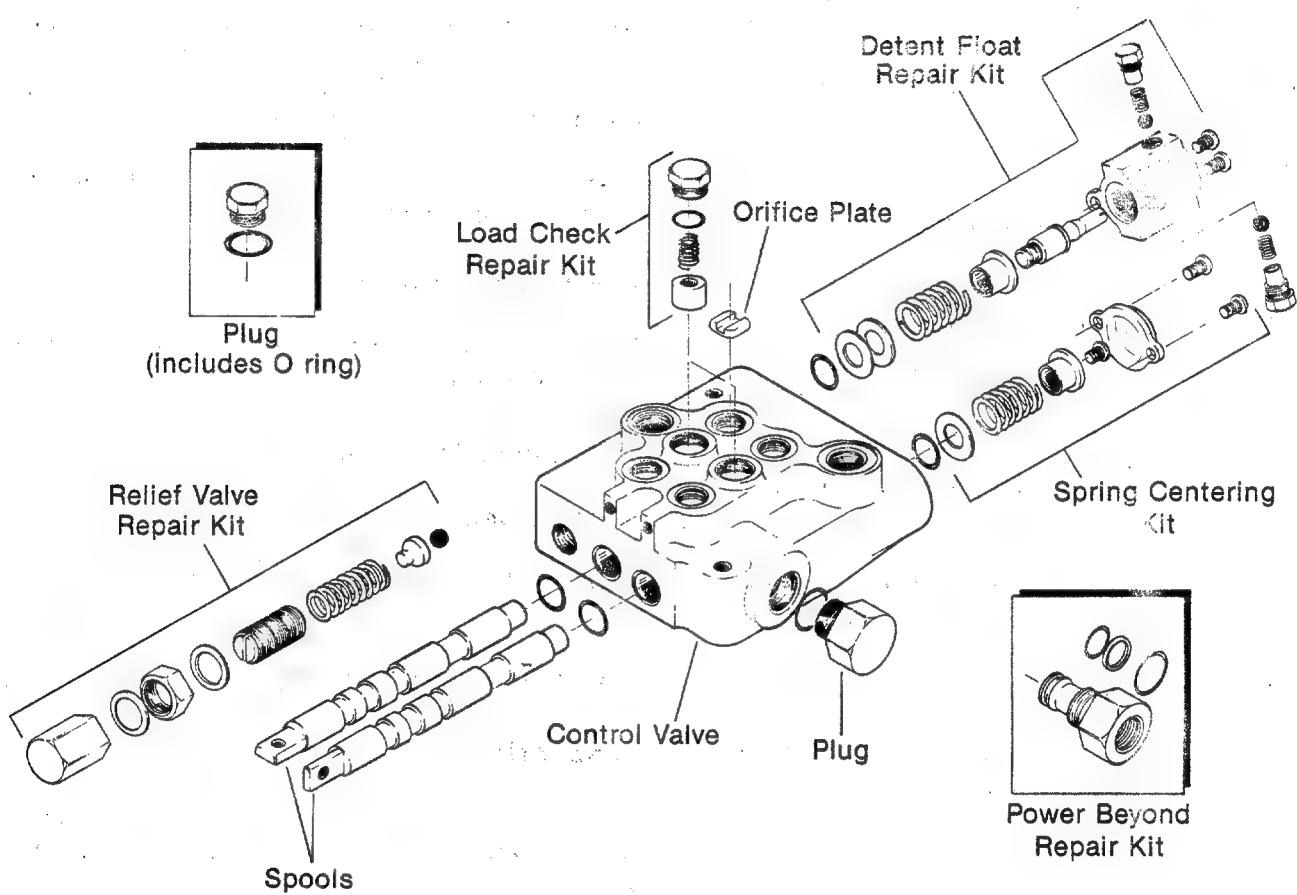


Fig. 13

# SERVICE

## Control Valve

### Control Valve Removal

Prior to removing control valve, ensure loader is on the ground and all hydraulic lines are relieved of oil pressure. Shut Tractor off, engage parking brake.

Disconnect hydraulic lines from Control Valve. Cap "IN" and "RETURN" lines to prevent contamination of hydraulic system.

Remove control valve mounting capscrews.

### Disassembly

Refer to Control Valve illustration for component identification.

### Control Levers and Connections

Remove Quick Disconnect Couplings and Adapter Fittings.

Plug all ports and thoroughly clean Control Valve.

Disconnect control lever linkage from valve and remove levers.

### Load Check Poppets

Unscrew Load Check Poppet Plugs and remove Load Check Poppets and Springs.

### Relief Valve

Unscrew Relief Valve Cap, followed by Adjustment Screw and remove Relief Valve Spring, Ball retainer and Ball.

### Valve Spools

Prior to removal, mark Valve Spools to ensure they can be identified for installation in the same spool bores from which they were removed.

### Bucket Cylinder Spool

Remove Valve Spool End Cap and O-Rings and pull Valve Spool from Valve Body (pull out from spring end of spool).

### Lift Cylinder Spool (Float)

Remove the Detent Cap Plugs, Springs and Balls and remove the two Detent Cap mounting screws. Pull Valve Spool from Valve Body (pull out from spring end of spool).

If spool centering springs require replacement remove as follows:

### Bucket Cylinder Spool

Remove spring retainer mounting screw from end of Valve Spool.

### Lift Cylinder Spool (Float)

Unscrew Detent Spool from Valve Spool.

Remove the four Valve Spool O Rings from the valve body.

Thoroughly clean all parts.

### Inspection

Remove any nicks or burrs from valve components and inspect for evidence of excessive wear.

#### Note:

If internal leakage, with the Valve Spools in the spring centered position has been experienced, Valve Body and/or Valve Spool wear is indicated. If this condition exists the Control Valve Assembly must be replaced.

# SERVICE

## Control Valve

Inspec  
or da  
tional  
Valve Body for wear

Inspect P  
damage.  
Ball Seat for wear or

Inspect Lift  
for excessiv  
e Valve Spool "Detent Spool"  
etent area.

**Note:**  
If Float Spool  
or tends to be  
tent Spool" w  
indicated and  
ed.  
not stay in "Detent" position  
it to get into "Detent", "De  
d/or weak Detent Springs are  
ected parts should be replac  
ed.

Inspect Valve Spool Return Springs for evidence  
of wear/damage.

**Note:**  
If Valve Spool(s) was not centering properly and  
Valve Spool slides freely in Valve Body a weak or  
broken return spring is indicated.

Inspect Relief Valve Spring for damage and  
distortion.

Inspect Load Check Poppets and Poppet Return  
Springs for damage and distortion.

It is recommended that all O Rings be replaced  
during Valve Service.

## Assembly

Refer to illustration for reference to Parts  
Assembly.

Thoroughly clean and dry all parts.

Carefully install the four O Rings in the Valve  
Body Spool bore O Ring grooves.

**Note:**  
Coat O Rings with clean hydraulic oil prior to in  
stallation.

## Valve Spools

Assemble Spool Return Springs on Valve Spools  
if they were removed previously.  
Short Spring - used on Standard Spool  
Long Spring - used on Float Spool.

Coat Valve Spools with clean hydraulic oil and  
carefully install in Valve Body. Install End Cap  
and Detent Cap mounting screws.

## Note:

1. Extreme care should be taken during Valve  
Spool installations to ensure O Rings are  
not damaged.
2. "Float" Valve Spool is installed in Valve  
Body adjacent to Relief Valve.

Following Detent Cap installation, install Detent  
Balls, Springs and Caps.

## Load Check Poppets

Coat Load Check Poppets with clean hydraulic  
oil and place in Valve Body followed by Load  
Check Springs and Plugs.

## Note:

New O Rings should be installed on Plugs.

# SERVICE

## Control Valve

### Control Lever and Hydraulic Connections

Install Control linkage as illustrated, Fig. 14.

Install Adaptor Fittings and Quick Disconnect Couplers.

#### Note:

1. Inspect Adaptor Fitting O Rings and replace if required.
2. Color Code Rings should be installed to correspond with Color Code Rings on Hydraulic Hoses that connect to the Control Valve.

### Installation

Mount Control Valve on Valve Stand.

Reconnect hydraulic hoses to they were removed.

#### Note:

1. Refer to Hydraulic System Schematic Diagram to check that hydraulic connections are correct.
2. Relief Valve Setting should be adjusted immediately following installation startup as described under Relief Valve Adjustment.

Check for hydraulic leaks and ensure hose routings do not result in hydraulic hoses rubbing or catching on adjacent tractor/loader components.

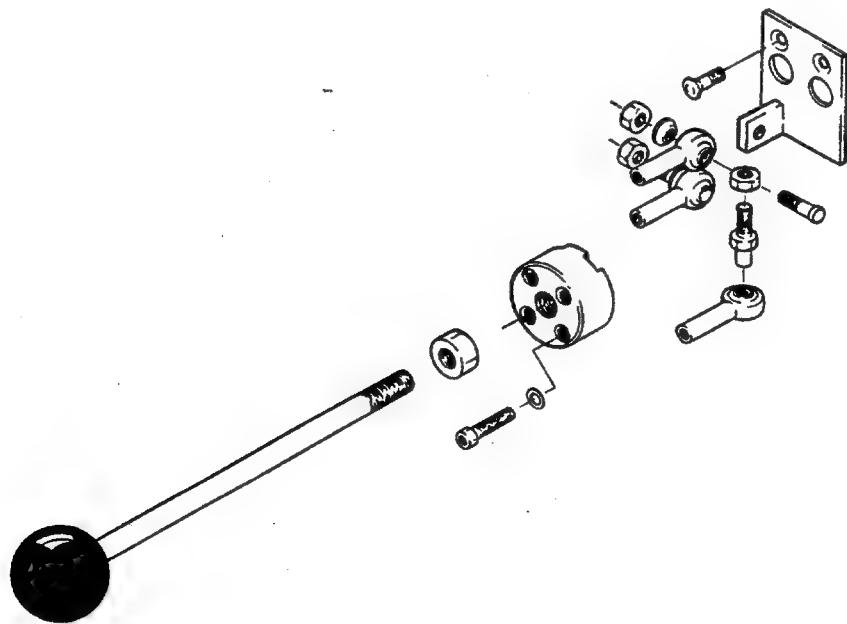


Fig. 14

# SERVICE

## Relief Valve Test/Adjustment

**Important:**

Safety glasses should be worn when performing this adjustment.

Install a 0-4000 PSI Test Gauge into the unused Loader Control Valve pressure port ("IN") at the Control Valve. Fig. 15.

Start tractor and run engine at operating speed to bring hydraulic fluid up to normal operating temperature.

With engine at maximum R.P.M., shift loader control valve bucket cylinder spool to fully retract bucket cylinders and hold in this position to obtain hydraulic system relief pressure.

Observe pressure reading on Test Gauge.

**Important:**

Do not maintain Hydraulic System at Relief Pressure for more than 10 second intervals to prevent overheating of hydraulic system.

Adjust Relief Pressure to specification by removing Relief Valve Cap, loosening Locknut and turning Adjustment Screw:

"In" (clockwise) to increase Relief Pressure.

"Out" (counter-clockwise) to decrease Relief Pressure.

**Note:**

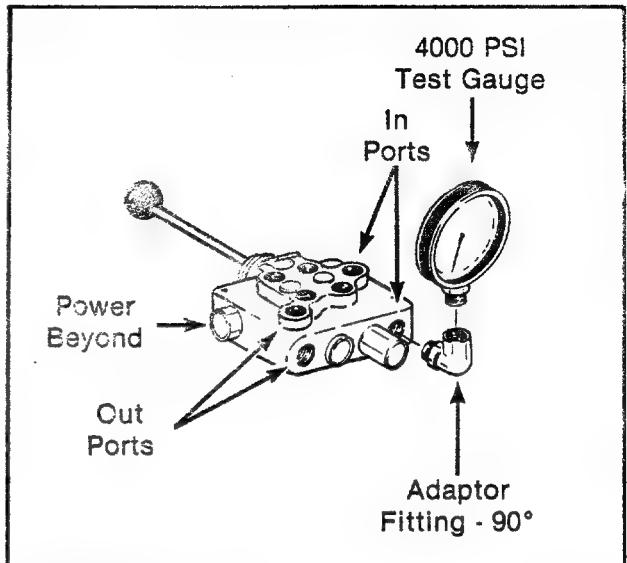
Refer to "Loader Specifications" for Relief Valve Setting.

Retorque locknut and reinstall Relief Valve Cap.

Recheck relief pressure.

Shut tractor OFF, remove Test Gauge and reconnect hydraulic lines.

Start tractor and check for leaks.



Relief Valve Test

Fig. 15

# TROUBLE SHOOTING

This Trouble Shooting Chart is provided for reference to possible Loader Operational Problems.

Determine the "Problem" that best describes the operational problem being experienced and eliminate the "Possible Causes" as listed by following the "Correction" procedures.

For further assistance contact your dealer.

PROBLEM	POSSIBLE CAUSE	CORRECTION
<b>Lift and Bucket Cylinders Inoperative</b>	Low Hydraulic Fluid level. Hydraulic hoses connected incorrectly. Hydraulic Hoses to/from Control Valve "Blocked". Loader Control Valve stuck "Open".	Check and replenish Hydraulic Fluid. Check and correct hydraulic hose connections. Check for damaged (kinked) hoses, etc. Check system pressure. Repair or replace Relief Valve.
<b>Lift or Bucket Cylinders Inoperative</b>	Low System pressure supplied from Hydraulic Pump. Control Valve Linkage broken. Quick Disconnect Coupler(s) are not fully connected or "Flow Check". Hydraulic Hose or Tubeline Blockage Cylinder Piston Assembly defective (not sealing). Control Valve blockage.	Check system pressure. Refer to "Hydraulic Pump Capacity Inadequate". Inspect. Repair as required. Check Coupler connections. Replace coupler(s) if necessary. Check for evidence of damage to hoses or tube lines that would block flow of oil between cylinders and control valve. Check cylinders for internal leakage as described in service section under Cylinder Leakage Tests. Inspect for blockage. Disassemble valve if necessary.
<b>Lift and/or Bucket Cylinders Operate in Wrong Direction Relative to Control Valve Lever Position</b>	Hydraulic hoses connected incorrectly.	Correct hydraulic hose connections.

# TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
<b>Slow or Erratic Lift</b>	Low Hydraulic Fluid level. Cold Hydraulic Fluid.	Check/replenish <b>Hydraulic FILL</b> Allow hydraulic system to warm up to operating temperature.
	Engine R.P.M. too slow (Hydraulic Pump R.P.M. too slow).	Increase engine <b>speed</b> to obtain <b>satisfactory</b> loader operation.
	Excessive weight in bucket. Material weight exceeds maximum specified Loader capacity.	Reduce material <b>loads</b> .
	Control Valve Linkage binding/defective.	Check control valve linkage and repair if worn/defective.
	Aeration of Hydraulic Fluid.	Refer to "Aeration of Hydraulic Fluid".
	Quick Disconnect Coupler Restriction or Coupler "Flow Checks".	Check coupler(s). Repair or replace.
	Orifice Plate installed upside down.	Check orifice plate installation.
	Hydraulic Hose or Tubeline Restriction (Hoses/Tubeline kinked or pinched).	Check hoses and tubelines for evidence of restriction.
	Lift Cylinder Piston Assembly Leakage.	Check cylinders for leakage as described in Service Section under Cylinder Leakage Tests.
	Relief Valve Erratic or Set Below Specifications.	Check Relief Valve Setting as described under Relief Valve Test.
	Control Valve Leaking Internally. (Bypassing fluid within valve.)	Replace Control Valve and recheck operation.
	Inadequate Hydraulic Pump Capacity	Refer to "Hydraulic Pump Capacity Inadequate".

# TROUBLE SHOOTING

	<b>POSSIBLE CAUSE</b>	<b>CORRECTION</b>
<b>Aeration of Hydraulic Fluid (generally indicated by foamy appearance of fluid)</b>	Engine R.P.M. too slow.	Increase Engine <i>R.P.M.</i>
	Excessive Load - Material weight exceeds specified Loader capacity.	Reduce load.
	Relief Valve setting below specifications.	Check Relief <i>Valve Setting</i> as described under Relief Valve Test.
	Lift Cylinder Piston Assembly Leakage.	Check cylinders for leakage as described in Service Section under Cylinder Leakage Tests.
	Control Valve leaking internally.	Replace Control Valve and recheck operation.
	Hydraulic Pump defective.	Refer to "Hydraulic Pump Capacity Inadequate".
	Low Hydraulic Fluid Level	Check and refill Hydraulic System to proper level. See Lubrication and Maintenance Section.
	Air leaking into suction side of hydraulic pump.	Check for loose or defective connections between reservoir and hydraulic pump.
	Hydraulic Fluid Foaming due to improper hydraulic oil usage.	Replace Hydraulic Fluid and Filter.
<b>System Relief Valve Squeals</b>	Cold Hydraulic Fluid.	Allow hydraulic fluid to warm up to operating temperature.
	Excessive Load in Bucket. Weight exceeds specified Loader capacity.	Reduce loads.
	Relief Valve Setting below specifications.	Check Relief Valve Setting as described under Relief Valve Test.
	Hydraulic hose, tubeline or Quick Disconnect Coupler Restriction.	Check for evidence of restriction in hydraulic oil flow. Repair or replace defective component(s).

# TROUBLE SHOOTING

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>CORRECTION</b>
<b>Loader Drops with Control Valve Spool in "Centered" Position (No external oil leakage evident.)</b> <b>Note: A gradual drop over an extended period is a normal condition.</b>	Cylinder Piston Assembly Leakage.  Control Valve Internal Leakage	Check Cylinders for leakage as described under Cylinder Leakage Tests  Replace Control Valve and recheck.
<b>Control Valve Spool(s) Will Not Return (Position) to "Centered" Position</b>	Control Lever/Linkage Binding.  Control Valve Spool Centering Spring broken.	Determine origin of binding and repair.  Replace Centering Spring. Refer to Valve Service procedure.
<b>External Hydraulic Fluid Leakage</b>	Control Valve Spool binding in Valve Body Spool bore.  Loose hydraulic connection.  Defective hydraulic hose, tubeline, adaptor fitting or adaptor fitting O ring.  Control Valve O rings defective.  Control Valve Spool or Body damaged/or worn.	Disassemble valve for inspection and repair. Refer to Valve Service procedure.  Tighten loose connection.  Check for origin of oil leak and replace defective part.  Replace defective O rings.  Replace Control Valve.
<b>Loader Boom Drops Too Fast (when Control Lever positioned to down)</b> <b>Note: Control Lever should be "Feathered" when lowering loader boom with loaded bucket to control drop rate.</b>	Cylinder Rod Packing Set leakage.  Orifice Plate missing, installed upside down, or orifice hole size is incorrect.	Perform Cylinder Leakage Test for Rod Packing Set as described under Cylinder Leakage Tests.  Check Orifice Plate for correct installation etc.

## TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
<b>Hydraulic Pump Capacity - Inadequate</b>	Cold Hydraulic Fluid. Engine R.P.M. too slow. Low hydraulic fluid supply.	Allow hydraulic fluid To Run up to operating temperature Increase Engine R.P.M.  Refer to Lubrication and Maintenance Section.
<b>Lift Cylinder Rods Bend when Lift Cylinders extended</b>	Hydraulic Hose Restriction. Hydraulic Pump defective.	Check for evidence of restriction in hydraulic hoses.  Replace hydraulic pump if determined to be defective.
<b>Bucket Cylinder Rods Bend when Bucket cylinders extended</b>	Excessive shock load on Lift during transport.	Replace defective parts. Review and observe proper and safe operational practices.
<b>Bucket Cutting Edge Wear is "Uneven" - Side to Side</b>	Back grading or dozing with bucket cylinders extended	Replace defective parts. Review and observe proper and safe operational practices.
<b>Bucket Cutting Edge Wear Rate is Excessive (Wear rate is even across full width of bucket on concrete)</b>	Bucket is not level to ground.  Incorrect Operational practices. Excessive down pressure placed on Bucket when being used on hard abrasive surfaces.	Check Rear Tire Inflation and adjust pressures to level bucket to ground.  Refer to Operation - Scraping section for correct operating procedures. Utilize Float position.
<b>Note: Extensive use of bucket on concrete/asphalt surfaces will accelerate wear rate of bucket cutting edge.</b>	Bucket Wear Pads worn.	Replace wear pads.

# HYDRAULIC SYSTEM Schematic

- 1 - Bucket Cylinder Extend
- 2 - Bucket Cylinder Retract
- 3 - Lift Cylinder Extend
- 4 - Lift Cylinder Retract

Bucket Cylinders

 - Quick Disconnect Coupler

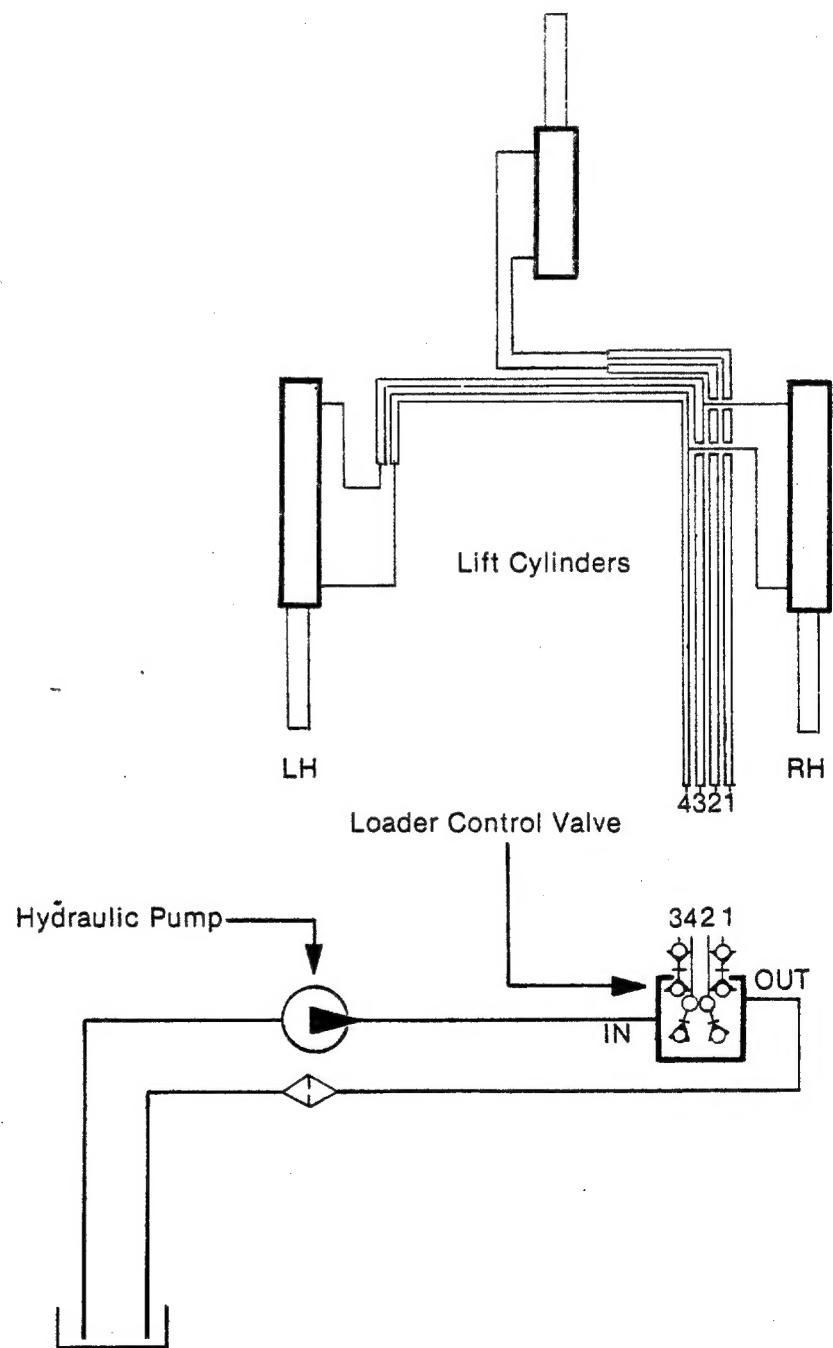


Fig. 16

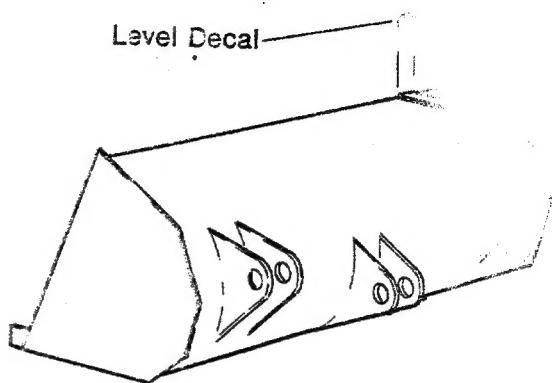
## ITEMS AND ACCESSORIES

fully rolled high  
material loading and more  
material dumped.

Bucket, which creates its own  
premium quality bevelled  
edge. The longevity of bucket service  
is increased due to less wear and distortion.

A fixed Bucket Level Indicator is incorporated on  
the Material Bucket Attachment. It enables the  
operator to position the Bucket Attachment level  
on the ground quickly and easily.

A "Level" decal is supplied with the Loader and  
is to be applied on the Top Horizontal Surface of  
the Bucket Level Indicator.



## LIMITED WARRANTY

### I. PRODUCTS COVERED

This warranty applies to all Bolens® branded equipment. Troy-Bilt® branded tractors, mulching mowers, and tillers, gas and electric sprayers, and all W-W Grinder® branded equipment to include their attachments and/or accessories and all Troy-Bilt® branded equipment sold as a commercial - institutional - industrial - rental or demonstrator application.

### II. PRODUCT WARRANTY: NON COMMERCIAL RESIDENTIAL: THREE YEAR LIMITED WARRANTY

All new Bolens®, Troy-Bilt®, and W-W Grinder® equipment specified above is warranted by Garden Way, Inc. to the original retail purchaser only, to be free from defects in material and workmanship, under normal use and service for a period of three (3) years from date of purchase.

Engines manufactured by Briggs & Stratton, Kohler and Tecumseh or transmissions manufactured on Peerless will be warranted for this three year warranty period through the authorized repair stations of their respective manufacturers.

**EXCLUSIONS** — The following items are not covered under the second and third year of this extended home limited warranty: Belts, Hoses, Seats, Batteries, Blades, Knives, Tines, Filters, Tires, Wheels, Paint and Appearance Items, Light Bulbs, and similar items which are normally replaced through periodic maintenance.

### III. PRODUCT WARRANTY: COMMERCIAL — INSTITUTIONAL — INDUSTRIAL — RENTAL — DEMONSTRATOR: ONE YEAR LIMITED WARRANTY

The Commercial, Institutional, Industrial, Rental and Demonstrator Limited Warranty covering defects on material and workmanship will be for a period of one (1) year, from date of purchase on all Bolens®, Troy-Bilt® and W-W Grinder® units and their manufactured attachments. This warranty applies to the original purchaser only.

Engines manufactured by Briggs & Stratton, Kohler and Tecumseh, and transmissions manufactured by Peerless will also be warranted for this one (1) year warranty period through the authorized repair stations of their respective manufacturers.

### IV. GENERAL INFORMATION

Garden Way, Inc.'s obligation under this warranty is limited to the repair or replacement, at its option, by an authorized Garden Way equipment dealer, of any part found to be defective in material or workmanship, without charge for parts and labor.

In order to obtain warranty service, the owner is responsible for:

- 1) Providing proof of purchase documentation, ownership registration or copy of bill of sale.
- 2) Informing any authorized Garden Way equipment dealer of the defect and making the product available for repair.  
(Charges for pick-up, delivery and service calls are not covered by this warranty.)

This warranty does not cover defects, malfunctions or failures caused by:

- 1) Use of unauthorized accessories or attachments.
- 2) Lack of reasonable and necessary maintenance as specified in the "Operation and Safety Instructions".
- 3) Misuse, accidents or normal wear.

**DISCLAIMER OF CONSEQUENTIAL DAMAGES:** GARDEN WAY, INC. SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR EXPENSE OF ANY KIND, INCLUDING BUT NOT LIMITED TO COST OF EQUIPMENT RENTAL, LOSS OF PROFITS OR COST OF HIRING SERVICES TO PERFORM TASKS NORMALLY PERFORMED BY THE EQUIPMENT.

**LIMITATION OF IMPLIED WARRANTIES:** ANY IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL BE LIMITED IN DURATION TO A PERIOD OF THREE YEARS (1 YEAR IF PRODUCT IS PURCHASED FOR COMMERCIAL, INSTITUTIONAL, INDUSTRIAL, RENTAL OR DEMONSTRATOR USE) FROM THE DATE OF SALE.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR LIMITATIONS ON HOW LONG IMPLIED WARRANTY LASTS. THEREFORE, THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For warranty information:  
GARDEN WAY, INCORPORATED  
102 & 9th Ave. Troy, NY 12180

GARDEN WAY, INCORPORATED  
215 South Park Street, Port Washington, Wisconsin 53074